


PATENT COOPERATION TREATY
PCT
INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

REC'D 13 DEC 2004

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Applicant's or agent's file reference 53389-11/DPC	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA416)	
International application No. PCT/CA 03/01599	International filing date (<i>day/month/year</i>) 21.10.2003	Priority date (<i>day/month/year</i>) 22.10.2002
International Patent Classification (IPC) or both national classification and IPC C08K3/34		
Applicant E.I. DU PONT DE NEMOURS AND COMPANY		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 7 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 6 sheets.</p>		
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none">I <input checked="" type="checkbox"/> Basis of the opinionII <input type="checkbox"/> PriorityIII <input checked="" type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicabilityIV <input checked="" type="checkbox"/> Lack of unity of inventionV <input checked="" type="checkbox"/> Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statementVI <input type="checkbox"/> Certain documents citedVII <input type="checkbox"/> Certain defects in the international applicationVIII <input type="checkbox"/> Certain observations on the international application		
Date of submission of the demand 21.05.2004	Date of completion of this report 10.12.2004	
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Bergmans, K Telephone No. +31 70 340-4189	



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/CA 03/01599**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-15 as originally filed

Claims, Numbers

1-45 received on 17.11.2004 with letter of 11.11.2004

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
 - ☐ the language of publication of the international application (under Rule 48.3(b)).
 - ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:
- ☐ contained in the international application in written form.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority in written form.
 - ☐ furnished subsequently to this Authority in computer readable form.
 - ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
 - ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.
4. The amendments have resulted in the cancellation of:
- ☐ the description, pages:
 - ☒ the claims, Nos.: 2,14-17,25, 39-42
 - ☐ the drawings, sheets:
5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).
- (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)
6. Additional observations, if necessary:

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III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:
 - ☐ the entire international application,
 - ☒ claims Nos. 2,14-17,25, 39-42
because:
 - ☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (specify):
 - ☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):
 - ☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
 - ☐ no international search report has been established for the said claims Nos.
2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:
 - ☐ the written form has not been furnished or does not comply with the Standard.
 - ☐ the computer readable form has not been furnished or does not comply with the Standard.

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees, the applicant has:
 - ☐ restricted the claims.
 - ☐ paid additional fees.
 - ☐ paid additional fees under protest.
 - ☒ neither restricted nor paid additional fees.
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is
 - ☐ complied with.
 - ☒ not complied with for the following reasons:
see separate sheet
4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

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☐ all parts.

☒ the parts relating to claims Nos. 1,3-13,18-24,26-38,43-45 .

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	5,30
	No: Claims	1,3-13,18-24,26-38,43-45
Inventive step (IS)	Yes: Claims	
	No: Claims	1,3-13,18-24,26-38,43-45
Industrial applicability (IA)	Yes: Claims	1,3-13,18-24,26-38,43-45
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item I

No required additional search fees were paid by the applicant. Consequently, this International Examination is restricted to the invention first mentioned in the claims; It is covered by the claims 1,3-7,11-19,58-66. The subject-matter of the invention 2-6 is not published in respect of which no search fees has been paid.

The applicant amended the claims filed with the letter of 11/11/2004. Since amended claims may not relate to unsearched subject-matter, the amended claims 2,14-17,25, 39-42 were neglected and the examination was based on the claims 1,3-13,18-24,26-38,43-45.

All amendments related to claims 1,3-13,18-24,26-38,43-45 are allowable under article 19(2)PCT

Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Novelty (Art. 33 (2) PCT)

1.The document D1 (WO9832795) discloses a rheology modified ethylene elastomer composition comprising a peroxide modified ethylene alpha olefin and a filler. The filler can be selected from talc, clay or a silicone type. The composition further comprises optionally an ethylene alpha olefin which is not rheology modified and other additives. The composition is used for preparing articles for automotive application using injection molding methods. The composition is characterised by good scratch and mar properties. The subject matter of claims 1,3,4,6,7,18-24,28,29,31,43-45 over D1 is considered to be not novel (Art. 33(2) PCT).

2. The document D3 (WO9732922) discloses a composition comprising a peroxide rheology modified polyolefin, and a filler. Optionally, the composition further comprises an additional rheology modified or unmodified polymer (page 20), anhydride modified polymers (page 29), or other additives. The filler can be selected from talc, clay or a silicone type filler. The anhydride modified polymer is interpreted as a compatibiliser. The rheology modifier is a peroxide compound in combination with an other assistant (page 18 lines 7,8).

The composition is used for preparing articles for automotive application using injection molding methods. The subject matter of claims 1,3,4,6,7,18-23,24,28,29,31,32,43-45 over D3 is considered to be not novel (Art. 33(2) PCT).

3. The document D4 (US6319976) discloses a composition comprising an ethylene polymer (soft ethylene elastomer), a compatibiliser (column 9 line 17), and a mixture of additives to improve the mar and scratch resistance (column 9 lines 24-55). Examples of the additives present in the mixture are talc, dimethylpolysiloxane, mica, and aluminosilicate. The fillers can be blended in the composition by masterbatch methods (claim 1 point e(b)) wherein the matrix of the masterbatch is an ethylene polymer. The composition is used in the automotive industry using e.g. injection molding methods (column 9 line 55). The subject matter of claims 1,3,4,6-13,22,23,24-29,31-38,43-45 over D4 is considered to be not novel (Art. 33(2) PCT).

Inventive step (Art. 33(3) PCT)

Document D1, which is considered to represent the most relevant state of the art, discloses a rheology modified ethylene elastomer composition comprising a peroxide modified ethylene alpha olefin and a filler. The subject-matter of claims 1,3-13,18-24,26-38,43-45 differs from this known D1 in

- A) an activated alumina filler or mica filler or a polydimethylsiloxane filler
- B) a co-agent with the peroxide

Examples in the present application show that the distinguishable feature leads to an improved scratch and mar resistance if a filler e.g. polydimethylsiloxane is used in a rheology modified elastomeric composition.

The problem to be solved by the present invention may be regarded as a rheology modified thermoplastic elastomer composition with improved scratch and mar properties. The solution proposed in claims 1,3-13,18-24,26-38,43-45 of the present application cannot be considered as inventive (Art. 33(3) PCT) because the use of alumina filler or polydimethylsiloxane filler or mica filler to improve the scratch and mar property of a composition is known from the prior art (see document D4 (US6319976) and D5 (US5731376)). The use of a co-agent e.g. trimethylolpropane trimethacrylate with peroxide in peroxide rheology modified elastomeric composition is also known from the prior art (see document D6 (US2002115796))

The skilled man would find enough suggestions in the state of the art to use these specified fillers in a composition to improve the scratch and mar resistance.

Re Item VII

Certain defects in the international application

1. Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in documents D3 and D4 is not mentioned in the description, nor are these documents identified therein.
2. The specification for an international application should be capable of being understood without reference to any other document (cf PCT Guidelines Ch. II 4.17). The expression "hereby incorporated by reference" found in the description are therefore not according to the PCT requirements. The specification for an international application should be capable of being understood without reference to any other document (cf PCT Guidelines Ch. II 4.17).

Re Item VIII

Certain observations on the international application

Clarity (Art. 6 PCT)

1. The relative term "effective amount" used in the claim 1 has no well-recognised meaning and leave the reader in doubt as to the meaning of the technical feature to which it refer, thereby rendering the definition of the subject-matter of said claim unclear (Article 6 PCT).
2. The statement "preferably" used in claims 3,11,12,24,28,36,37 makes the claims unclear. If the options are meant to be preferred embodiments of the invention they should be claimed in one or more dependent claims.
3. The subject-matter of claim 18 is not novel since the claim defines a product by its process of manufacture. Product by process claims are only allowable if the product as such is novel and inventive. No specific features of the rheology modification in claim 18 is given that makes the product as such novel.
4. Claim 45 does not appear to recite any feature which is not already mentioned in claim 43. The claim is redundant and should be deleted for the sake of conciseness (Art. 6 PCT).

WE CLAIM:

1. A composition comprising a soft ethylene elastomer component and an effective amount of filler and silicone to impart improved scratch and mar resistance properties to the composition while not significantly decreasing the softness of the composition.
2. The composition of claim 1 further comprising a compatibilizer.
3. The composition of claims 1 or 2 wherein the filler comprises from about 1% to about 20%, preferably from about 2% to about 15%, more preferably from about 3% to about 12% and most preferably from about 4% to about 10% by weight of the total composition.
4. The composition of claim 3 wherein the filler is a hard, spherical or elongated filler.
5. The composition of claim 4 wherein the filler is activated alumina.
6. The composition of claim 3 wherein the filler is a platy filler.
7. The composition of claim 6 wherein the filler is selected from the group consisting of mica, talc or clay.
8. The composition of claim 7 wherein the filler is mica.
9. The composition of claim 8 wherein the mica is a wet-ground mica
10. The composition of claim 9 wherein the mica is a wet-ground mica of 325 mesh.

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11. The composition of any of claims 1 to 10 wherein the silicone comprises from about 0.1 to about 2.5 %, preferably from about 0.2 to about 1.0%, most preferably from about 0.25 to about 0.6% of the total composition.
12. The composition of claim 11 wherein the silicone is a higher molecular weight silicone with a fluid viscosity of at least 1,000 CSt, preferably at least 10,000 CSt.
13. The composition of claim 12 wherein the higher molecular weight silicone is a polydimethylsiloxane.
14. The composition of any of claims 2 to 13, wherein the compatibilizer comprises from about 0.1% to about 10%, preferably from about 0.25% to about 7% by weight of the total composition.
15. The composition of claim 14 wherein the compatibilizer is a functionalised polyolefin.
16. The composition of claim 15 wherein the compatibilizer is a maleic anhydride grafted polyolefin.
17. The composition of claim 16 wherein the compatibilizer is a maleic anhydride grafted EAO polymer.
18. The composition of any one of claims 1 to 17, wherein the soft ethylene elastomer component is a rheology-modified, low gel thermoplastic elastomer composition comprising at least one elastomeric EAO polymer or EAO polymer blend and at least one high melting polymer selected from polypropylene homopolymers and propylene/ethylene copolymers.
19. The composition of claim 18, wherein the elastomeric EAO polymer or EAO polymer blend comprises from about 50 to about 95% by weight of the soft ethylene

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elastomer component and the high melting polymer comprises from about 5 to about 50% by weight of the soft ethylene elastomer component.

20. The composition of claim 18 or 19, wherein the rheology modification is peroxide induced using a level of peroxide sufficient to provide the combination of characteristics, the peroxide being an organic peroxide selected from α , α' -bis(t-butylperoxy)-diisopropylbenzene, dicumyl peroxide, 2,5-dimethyl-2,5-di-(t-butylperoxy)hexane, di-t-butylperoxide, 2,5-di(t-amyl peroxy)-2,5-dimethylhexane, 2,5-di-(t-butylperoxy)-2,5-diphenylhexane, bis(alpha-methylbenzyl)peroxide, benzoyl peroxide, t-butyl perbenzoate and bis(t-butylperoxy)-diisopropylbenzene.

21. The composition of claim 20 further comprising at least one suitable co-agent with the peroxide.

22. The composition of any one of claims 1 to 21, further comprising at least one additive selected from the group consisting of EAOs that have not been rheology modified, process oils, plasticizers, specialty additives and pigments.

23. The composition of claim 22, wherein the specialty additives comprise one or more additives selected from the group consisting of: flame retardants; antioxidants; surface tension modifiers; anti-block agents; lubricants; antimicrobial agents such as organometallics, isothiazolones, organosulfurs and mercaptans; antioxidants such as phenolics, secondary amines, phosphites and thioesters; antistatic agents such as quaternary ammonium compounds, amines, and ethoxylated, propoxylated or glycerol compounds; hydrolytic stabilizers; lubricants such as fatty acids, fatty alcohols, esters, fatty amides, metallic stearates, paraffinic and microcrystalline waxes, silicones and orthophosphoric acid esters; mold release agents such as fine-particle or powdered solids, soaps, waxes, silicones, polyglycols and complex esters such as trimethylol propane tristearate or pentaerythritol tetrastearate; pigments, dyes and colorants; plasticizers such as esters of dibasic acids (or their anhydrides) with monohydric alcohols such as o-phthalates, adipates and benzoates; heat stabilizers such as organotin mercaptides, an octyl ester of thioglycolic acid and a barium or cadmium

carboxylate; ultraviolet light stabilizers such as a hindered amine, an o-hydroxy-phenylbenzotriazole, a 2-hydroxy,4-alkoxybenzophenone, a salicylate, a cyanoacrylate, a nickel chelate and a benzylidene malonate and oxalanilide; and zeolites, molecular sieves and other known deodorizers.

24. A process for preparing the composition of any one of claims 1-23 comprising the steps of:

- a. adding filler and silicone to a soft ethylene elastomer composition at a mixing temperature from about 180°C to about 220°C, preferably from about 190°C to about 210°C; and,
- b. pelletizing the composition of step (a) at a second temperature below the mixing temperature.

25. The process of claim 24 further comprising the step of adding a compatibilizer to the composition.

26. The process of claim 25 wherein the filler is added as a pre-made masterbatch

27. The process of claim 25 wherein the filler and the compatibilizer are added as a pre-made masterbatch

28. The process of claims 24 to 27 wherein the filler comprises from about 1% to about 20%, preferably from about 2% to about 15%, more preferably from about 3% to about 12% and most preferably from about 4% to about 10% by weight of the total composition.

29. The process of claim 28 wherein the filler is a hard, spherical or elongated filler.

30. The process of claim 29 wherein the filler is activated alumina.

31. The process of claim 28 wherein the filler is a platy filler.

32. The process of claim 31 wherein the filler is selected from the group consisting of mica, talc or clay.
33. The process of claim 32 wherein the filler is mica.
34. The process of claim 33 wherein the mica is a wet-ground mica
35. The process of claim 34 wherein the mica is a wet-ground mica of 325 mesh.
36. The process of any of claims 24 to 35 wherein the silicone comprises from about 0.1 to about 2.5 %, preferably from about 0.2 to about 1.0%, most preferably from about 0.25 to about 0.6% of the total composition.
37. The process of claim 36 wherein the silicone is a higher molecular weight silicone with a fluid viscosity of at least 1,000 CSt, preferably at least 10,000 CSt.
38. The process of claim 37 wherein the higher molecular weight silicone is a polydimethylsiloxane.
39. The process of any of claims 25 to 38, wherein the compatibilizer comprises from about 0.1% to about 10%, preferably from about 0.25% to about 7% by weight of the total composition.
40. The process of claim 39 wherein the compatibilizer is a functionalised polyolefin.
41. The process of claim 40 wherein the compatibilizer is a maleic anhydride grafted polyolefin.
42. The process of claim 41 wherein the compatibilizer is a maleic anhydride grafted EAO polymer.

43. An article of manufacture having at least one component thereof fabricated from the composition of any one of claims 1 to 23, the article of manufacture is selected from the group consisting of: automobile interior parts, automobile exterior parts, consumer goods with soft touch grips and consumer appliances with soft touch surfaces.

44. An injection molded article of manufacture having at least one component thereof fabricated from the composition of any one of claims 1 to 23 wherein the article of manufacture is used in airbag door or other automotive interior applications.

45. An article of manufacture having at least one component thereof fabricated from the composition of any one of claims 1 to 23 wherein the article of manufacture is used in automotive interior applications.

*** TOTAL PAGE.09 ***